Medical Sensor

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COVID-19 is a threat that has profoundly impacted the way we perceive our world. The main problem is that millions of people carry the virus and transmit it to others while not having any symptoms. This problem is magnified in developing nations as the high price of the PCR test deters pro-active testing and diagnosis. Consequently, researchers in the medical sector have been investigating various parameters that can be linked to the presence of COVID-19 in asymptomatic patients including the presence of various compounds in breath. Generally, viruses change the infected cell's metabolism, affecting the VOC concentrations that were exhaled through human's breath. COVID-19 caused dysregulation of multiple immune and metabolic components including lipids in human patients. As known, acetone is the waste metabolite for lipid degradation, thus upon down-regulation of these lipids in COVID-19 patients, the level of acetone exhaled in the breath decreased. Our project focuses on diagnosing people for COVID-19 existence by using a sample of the patient's breath. Our target is to measure the acetone concentrations in a human's breath with a SNO2 gas sensor, a highly selective acetone gas sensor, instead of the PCR technique. Our project showed respectively high efficiency compared to the COVID-19 PCR test and high sensitivity of 90 % and specificity of 94.35 %. In comparison to the high cost of PCR which is approximately 100 USD per test, here our device showed a low cost and it is expected to achieve a lower test price. Moreover, the project can diagnose COVID-19 in 30 seconds per test which is highly efficient compared to the PCR technique. From here, our project could be time-saving, feasible, cost-effective, and easy to use.